CHAPTER 1

INTRODUCTION

1.1 Overview

As we know, the students for 4 BEC were doing the experiment for subject Industrial Instrumentation (BEE 4523) at the lab manually. They need to start their experiment from connecting the instruments, find the data of experiment, calculate data and plot the graph for Point Calibration and Error Plot. So, they need more time to do this analysis and many calculations like to calculate the desired Unit under Test (UUT) output, actual Unit under Test output and the output error. Besides that, they need perform the uncertainty of measurement evaluation for one equipment calibration. They need calculate the uncertainty due to repeatability of the experiment, uncertainty contribution due to MSU error, the uncertainty due to UUT resolution/MSU resolution and combined standard uncertainty.

The computer based instrumentation system will be designed for temperature measurement using Resistance Temperature Detector, RTD. This system will be operated by using Matlab application. This system used GUI Matlab that can show the progress. It can use to solve these problems efficiently. This system developed for educational purpose. It means the students can use this system for their analysis of subject BEE 4523.

As overall, this system can look as the communication between the user and the instrument for finding the more accurate result and easy to plot the graph. This system works fast without need to do more works. The user needs to set the Master Standard Unit (MSU) value at the RTD and when values of temperatures reach at the MSU value at Digital Thermometer. The user presses the set button. The all data will transfer through the system to find the result and graph. This system also can calculate the output error, average, standard deviation and uncertainty. So, we can use this program to do the analysis.

1.2 Problem statement

1.2.1 Current situation

The students doing the experiment for subject Industrial Instrumentation in the lab. However, the problems are:

(i) Doing experiment manually

Firstly, they have more steps to setup the instruments. Then, they need to collect the data from instrument for this analysis.

(ii) More time

They need more times to do analysis for this experiment especially for temperature measurement. They rushed to find the result to calculate for output error, average, standard deviation and uncertainty. They also need to plot the graph.

1.2.2 Problem solution

This system can solve this situation and has advantages compare to another program.

i. This system was developed for educational purpose. The student from 4 BEC can use this system to do the analysis in lab. This system suitable to use for all computer that have installed Matlab software.

ii. This system can make work faster and easier when doing the analysis. It can calculate all calculations and plotting the graph.

1.3 Objective

The objectives of this project are:

i. Understanding about basic concept of temperature measurement instrumentation. The function of each instrument must know and to find the reading of temperature using RTD.

ii. Interface the temperature instrumentation with software using DAQ's (Data acquisition System) card. The PCI-1710HG is suggestion hardware that use for this project.

iii. Developing the system using MATLAB application. The GUI Matlab was use to show the progress of result and the graph efficiently. It also can calculate the output error, average, standard deviation and uncertainty.